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Equivalent surface finish of laser speckle induced perturbations in laser driven foils

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We have measured modulations imprinted by laser speckle in laser-driven CH_2 foils at 10^{14} W/cm^2 (laser wavelength 0.53 μm) and at 10^{13} W/cm^2 (laser wavelength 0.35 μm and 0.53 μm). We have calibrated the amplitude and Rayleigh-Taylor growth of these modulations with single-mode surface perturbations, converting the imprint to an equivalent surface finish. We examined this imprint for a static speckle patterns at the two drive colors, and, for 0.53 μm drive, with two different bandwidths on the drive laser. The shorter wavelength drive laser produced about 1.6 times the imprint of the longer. The addition of bandwidth and dispersion to the drive laser reduced the imprinted modulations, with the highest bandwidth showing the largest reduction in imprint, in agreement with LASNEX simulations.

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